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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/622,484      | 07/21/2003  | Michael Setton       | 015290-755          | 4980             |

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EXAMINER

POMPEY, RON EVERETT

ART UNIT PAPER NUMBER

2812

DATE MAILED: 06/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/622,484

Applicant(s)

SETTON, MICHAEL

Examiner

Ron E. Pompey

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 38-47 and 49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 40-43 is/are allowed.
- 6) ☒ Claim(s) 38,39,44-47 and 49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 02-17-05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 38-39 and 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (US 5,880,508) in view of admitted prior art or Ohiwa et al. (4,947,081).

Wu discloses the steps of:

For claim 38-39 and 44-48:

forming an interfacial layer (6, fig. 1), comprising silicon nitride or silicon oxynitride, on a silicon semiconductor substrate; and

forming a high dielectric constant layer (8, fig. 1) on the interfacial layer

forming a gate electrode of an electrically conductive material on the high dielectric constant layer; and

forming source and drain regions that are adjacent the gate electrode.

(col. 2, lns. 63-67 and col. 3, lns. 1-22; col.).

Wu, fails to disclose the limitations of: wherein the high dielectric layer comprises one of the following,  $Ta_2(O_{1-x}N_x)_5$  and to having a gate width of less than 0.3 micron. However the admitted prior art, on page 6, line 24 –26, or Ohiwa, column 2, lines 45-58, discloses that a high dielectric layer can be formed of the above compositions.

Also, in applicants' specification, page 7, line 25 – page 8, line 3, states that it is conventional for photoresist/lithography techniques to form a gate pattern that will form the line width of a gate less than 0.3 micron.

Therefore it would have been obvious to one of ordinary skill in the art to combine the admitted prior art (APA) and/or Ohiwa with Wu, because the above listed materials are art equivalent high dielectric material with  $Ta_2O_5$  of the Wu reference and that since Wu is not explicit on the size of the pattern used to form the gate the APA gives typical sizes when forming a gate electrode in the semiconductor art.

***Allowable Subject Matter***

3. Claims 40-43 are allowed.
4. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, either singly or in combination, fails to disclose the limitations of: wherein the high dielectric layer comprises one of the following compositions, a solid solution of  $(Ta_2O_5)_t - (ZrO_2)_{1-t}$ , a solid solution of  $(Ta_2O_5)_u - (HfO_2)_{1-u}$  wherein t and u range from about .09 to less than 1.

***Response to Arguments***

5. Applicant's arguments filed 2-17-04, pertaining to claims 38-49, have been fully considered but they are not persuasive. The applicant traverses the assertion in the previous and current Office Action(s) that applicant's specification discloses conventional photoresist/lithography techniques that would produce typical sizes, 0.3 microns, when forming a gate electrode. However, the specification states

"...Subsequently, a layer of photoresist material 160 is applied onto electrically conductive layer 120 before the photoresist is masked and patterned **using conventional photoresist techniques** to form a gate pattern. After etching, the line width (L) of the gate 121 is typically less than 0.3 micron, and preferably equal to or less than about 0.18 micron.", therefore from this statement it is clear that when using conventional photoresist techniques it is typical to produce a gate width less than 0.3 microns.

Applicant also argues that Ohiwa discloses a tantalum oxynitride as a transparent, high resistance semiconductor, as opposed to a high dielectric constant material. First, applicant never argues that Ohiwa does not disclose  $Ta_2(O_{1-x}N_x)_5$  wherein x ranges from greater than 0 to 0.6 and therefore whether Ohiwa calls it a high resistance semiconductor or a high dielectric constant material it is still the same material. Second, high dielectric constant materials can be high resistance semiconductor materials, because the high resistance of the material allows them to reduce the leakage current at higher fields than low dielectric constant materials. Which is one of the primary reasons for the use of high dielectric material.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

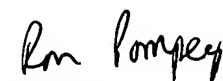
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E. Pompey whose telephone number is (571) 272-1680. The examiner can normally be reached on compressed.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Ron Pompey  
AU: 2812  
May 24, 2005

  
HA NGUYEN  
PRIMARY EXAMINER